

SINGLE-CHANNEL, ANTI-JAM, MAN-PORTABLE (SCAMP) TERMINAL BLOCK I



Army ACAT III Program

Total Number of Systems:	514
Total Program Cost (TY\$):	\$210.6M
Average Unit Cost (TY\$):	\$.215M
Full-rate production:	1QFY94
Production Decision for SCAMP AEHF Upgrade Kits:	1QFY05
Production Decision for SCAMP Block II:	3QFY07

Prime Contractor

Rockwell Collins, Inc.

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020

The Single-Channel, Anti-jam, Man-Portable (SCAMP) terminal is the rapidly deployable component of the Army's Military Strategic and Tactical Relay (MILSTAR) Advanced Satellite Terminal program. SCAMP will draw on the unique capabilities of the MILSTAR system and enable our forces to maintain *information superiority* during conflict, and enhance *full-dimensional protection* by using anti-jam and low-probability-of-intercept technologies.

The primary mission of SCAMP is to provide survivable extended-range communications to Corps and Division tactical units for command and control. SCAMP's use of MILSTAR's Low Data Rate (LDR) capabilities to interconnect small tactical units eliminates the line-of-sight limitations imposed by land-based radio communications systems. The SCAMP operates in a half-duplex mode at a maximum data rate of 2.4 kbps. The SCAMP program is divided into two separate development efforts: Block I

and Block II. Block I will develop an interim 37-pound terminal; Block II will produce a 12-pound terminal.

BACKGROUND INFORMATION

The Milestone III production decision for Block I SCAMP occurred in November 1994. The full-scale production contract for Block I SCAMP was awarded in February 1996. FOT&E for SCAMP was conducted in October-November 1998. FOT&E evaluated the operational effectiveness and suitability of the end-to-end system to support the Army's fielding decision for the Block I terminal.

The Block I SCAMP was re-designated as an Acquisition Category (ACAT) III program in January 1995. The Block II SCAMP remains an ACAT IC program. The SCAMP Block II program is in acquisition Phase 0 awaiting determination of whether the terminal will use only the MILSTAR waveform or include a modified Extremely High Frequency waveform compatible with other satellite programs under development. DOT&E continues oversight of the SCAMP program in order to maintain the system perspective in the oversight of the overall MILSTAR program.

TEST & EVALUATION ACTIVITY

A customer test was performed in a field and garrison operational environment in August 1996 to assess the terminal's progress. This test focused on three operational issues: (1) extending the range for voice and data communications in the field; (2) deployment, setup, and teardown of the equipment; and (3) interoperability with other MILSTAR terminals. On the basis of the customer test, Army Test and Evaluation Command (ATEC) performed an abbreviated OA of the Block I SCAMP terminal.

The SCAMP participated in the MILSTAR system tests involving the Army, Navy, and Air Force terminals in July 1997 and August 1998. In these Medium Data Rate (MDR) focused compatibility and interoperability developmental tests, the Service terminals were bench-connected to the MILSTAR Flight satellite payloads at the contractor's facility in Sunnyvale, CA. The Army's LDR/MDR capable Secure, Mobile, Anti-jam, Reliable, Tactical Terminal (SMART-T) and the Navy EHF Satellite Program (NESP) terminal, equipped with an MDR appliqué, participated in both MDR and LDR tests, while the Air Force Command Post Terminal tested LDR only.

The First Article Test (FAT) ran from April 1997-July 1998. FAT contained sub-test events that verify specific requirements and design characteristics from production specifications. The overall objective of the test was to verify that the SCAMP production terminal conformed to the requirements documents. FAT concluded with a confidence test, which indicated the terminal was ready for operational testing.

SCAMP FOT&E was conducted from October-November 1998 at Ft. Bragg, NC. FOT&E involved a 15-day test of five production terminals in a simulated wartime field environment to evaluate effectiveness, suitability, and survivability. Test scenarios exercised all terminal functions; the terminals were required to demonstrate interoperability with Army Common User Equipment and communicate with higher headquarters and supporting elements of other Services.

ATEC conducted a Limited User Test and Evaluation (LUTE) for the SCAMP Block I terminal in October-November 1999. This test was to provide an evaluation of the corrective actions taken to address the effectiveness and suitability of the terminal. Additionally, it provided the basis for the

Conditional Materiel Release and Fielding Statement released by ATEC on April 10, 2000. For effectiveness, voice quality and message completion rates were evaluated. For suitability, reliability, availability, maintainability, training, technical manuals and troubleshooting were evaluated. The test consisted of nine terminals and over 2,000 hours of operation organized in three 96-hour scenarios.

TEST & EVALUATION ASSESSMENT

ATEC found shortcomings in effectiveness and suitability during 1998 FOT&E, which were significant enough to warrant a failed rating in these two areas. Survivability was rated as marginal based on the need to do further electromagnetic environmental effects testing. The terminal was determined to be survivable in all areas adequately tested.

The 1999 LUTE re-evaluated operational effectiveness and suitability. The SCAMP terminal was assessed not to be effective as employed per the Operational Requirements Document (ORD) dated March 1992 and the Operational Mode Summary/Mission Profile (OMS/MP) dated May 1999. Contributing factors were voice Message Completion Rate (MCR) and setup/teardown times. Data communications met the requirement. The SCAMP terminal was assessed as not suitable as employed per the ORD and OMS/MP. The major factor was RAM.

The SCAMP terminal is required to transmit and receive voice and data messages legibly with a 90 percent call completion rate on a first attempt basis in a wartime mode of operations. See Figure 1. Numbers in parentheses represent performance during FOT&E.

Mode	Point to point	Network	Average performance
Data	95%	95%	95%
Voice	91%	86%	87% (85%)

Figure 1. LUTE Transmit and receive call completion performance

Additionally, during FOT&E SCAMP fell just short of the requirement for voice quality equal to or better than the standard Secure Telephone Unit III (STU III) voice quality.

The SCAMP is intended to be set up or torn down in ten minutes 90 percent of the time. TRADOC has proposed changing this requirement from 10 minutes to 15 minutes, so data was tabulated for both conditions during the LUTE. Whereas performance for setup meets the proposed 15-minute requirement, performance for teardown does not. For both setup and teardown at 10 minutes, performance was worse during the LUTE than during the FOT&E. See Figure 2. Numbers in parentheses represent performance during the FOT&E.

Operation	ORD (10 min)	TRADOC (15 min)
Setup	52% (65%)	91%
Teardown	46% (88%)	85%

Figure 2. LUTE Setup/teardown time performance

The SCAMP met the contractor's specification for altitude, wind, blowing rain, blowing dust, solar loading, high temperature and humidity, and low temperature, but was not tested for blowing sand, fungus, salt fog, leakage and immersion, icing and freezing rain, smoke, aerosol, snow and haze. As

tested, the SCAMP performance is unknown if deployed to certain geographic areas such as Korea, Saudi Arabia, Panama, the West Coast of the United States, and Germany.

The SCAMP terminal is required to achieve a Mean Time Between Operational Mission Failure (MTBOMF) of 600 hours (80 percent lower confidence level) in order to provide tactical forces with reliable communications on the move. The system demonstrated only 12 hours MTBOMF during FOT&E. Operational availability was tested during LUTE against the peacetime requirement of 91 percent and the wartime requirement of 92 percent.

	Brigade level	Division, Corps and Theater level	Corps and Theater level only
MTBOMF	72 hours	445 hours	857 hours
Ops availability	61%	90%	Not tested

Figure 3 LUTE MTBOMF test results

CONCLUSIONS

The SCAMP terminal is not operationally effective as a tactical system. Major contributing factors are voice MCR and setup/teardown times. Additional factors include mission data base distribution and incomplete environmental testing. Data communications meet the requirement.

The SCAMP is not operationally suitable for use in the tactical environment. The shortcomings in reliability and availability, as evidenced under operational test conditions, demonstrate that the system is not ready for unconditional fielding. However, during the LUTE, RAM performance was better than during FOT&E, and training and technical manuals improved.

RECOMMENDATIONS

The Program Office should continue aggressive action to correct the shortcomings in operational effectiveness and operational suitability.

SCAMP should not be approved for Full Materiel Release until its most significant effectiveness and suitability shortcomings are corrected. Fixes must be verified by operationally realistic testing. DOT&E agrees with ATEC's support of a Conditional Materiel Release which stipulated: (1) SCAMP Block I is fielded only at Division Headquarters and above for general forces and at Group Headquarters and above for Special Operations Forces; and (2) the Tactics, Techniques and Procedures for operation of the overall system are included in a more comprehensive training program.

Further testing must be conducted to determine SCAMP's ability to operate under a full range of electromagnetic, tropic, and cold region environments.

SCAMP operations, in particular the process of loading a data base from the Communications Planner to the SCAMP device, may be too complicated to qualify it as a general-purpose user terminal. Experienced signal or operations personnel should be used in this process.